3.14 MARINE VESSEL SAFETY

This section describes the marine vessel safety environment in the vicinity of the proposed Broad Beach Restoration Project (Project), and potential effects of Project-generated vessel traffic on public trust resources and values.

3.14.1 Environmental Setting Pertaining to the Public Trust

Broad Beach Restoration Area Location and Description

The Broad Beach Restoration Area (Project area) is limited to approximately 42 acres extending laterally for more than 6,700 feet from Lechuza Point to Trancas Creek Lagoon, including both public trust lands and adjacent private lands that support residential uses. The Project area also includes existing vertical and lateral access easements that could be impacted by the proposed Project. Additionally, it includes the Zuma Beach parking lot adjacent to Trancas Creek, proposed for temporary construction staging.

The near shore areas within the Project area would experience additional vessel traffic as described below

Off-Site Project Area Location and Description

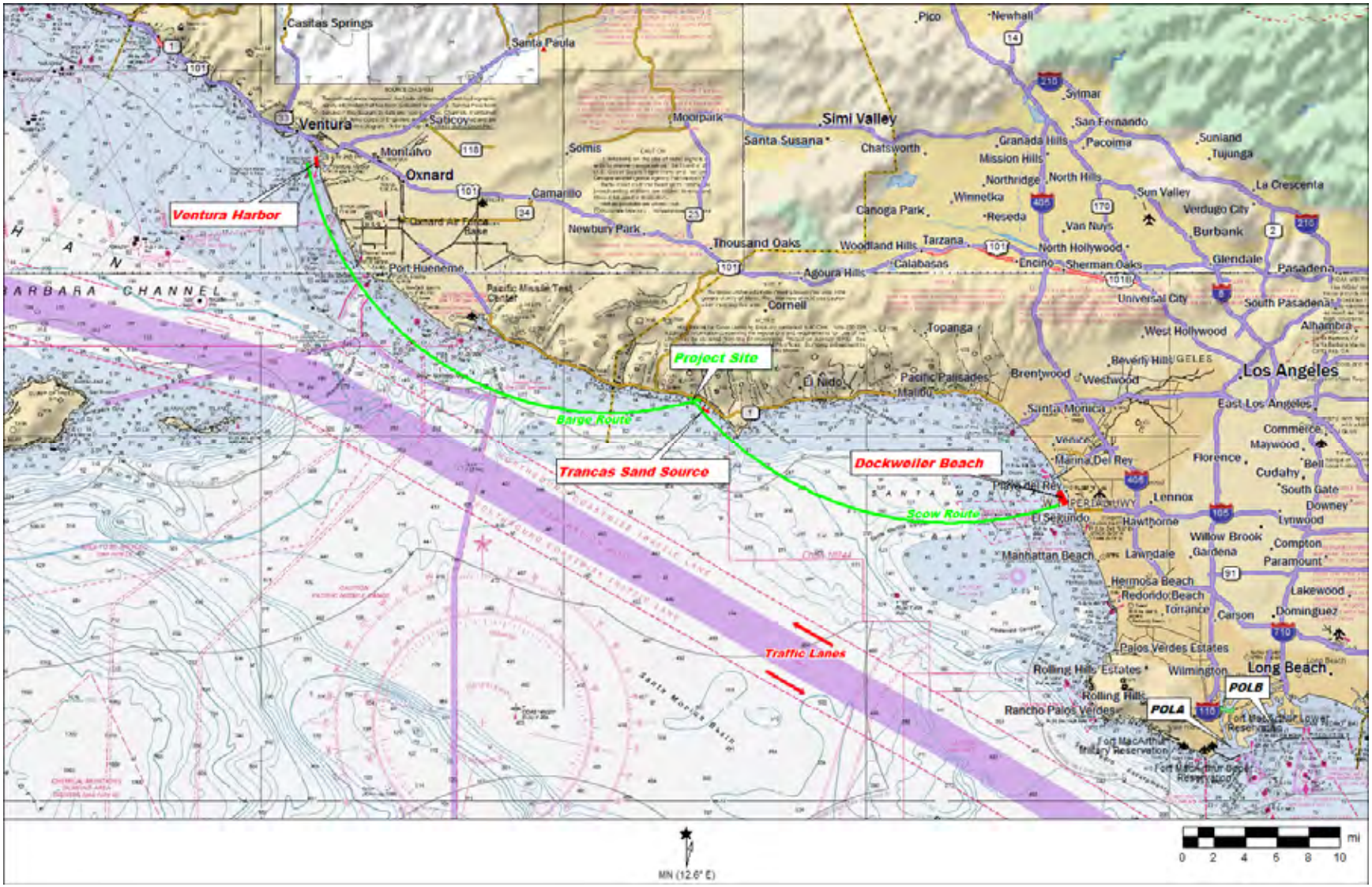
Off-site Project areas subject to potential direct Project impacts include the Trancas Sediment Deposit, the Ventura Harbor sand, and the Dockweiler State Beach borrow site as well as the sand transportation routes between these sites and the Project area.

For the most part, the borrow sites and transit routes would be located in an area between the main shipping lanes and the shoreline (see Figure 3.14-1). Vessel traffic in this region is dominated by traffic associated with the Port of Long Beach (POLB) and the Port of Los Angeles (POLA), with a minor contribution from the Port of Hueneme. Vessel traffic in the vicinity of the Trancas Sediment Deposit is dominated by commercial fishing and recreational boating activities.

Relationship Between Vessel Traffic and Public Trust Resources and Values

Vessel traffic has the potential to affect the public's right to safely use and enjoy public trust resources including Broad Beach and the public beaches in the immediate vicinity (e.g., Zuma) as well as the State tidelands and the waters offshore. Vessel traffic also has the potential to disturb or damage marine biological resources, which are considered public trust resources, through typical operations or accidental release of fuel or other hazardous materials. Potential for offshore spills of hazardous materials as a result of marine vessel traffic are discussed in Section 3.2, *Marine Water and Sediment Quality*.

Figure 3.14-1. Borrow Sites and Sand Transportation Routes



Vessel Transportation Safety

Vessel traffic levels are highly regulated by the U.S. Coast Guard (USCG) Captain of the Port (COTP) and the Marine Exchange of Southern California via the Vessel Traffic Service (VTS) to ensure the total number of vessels transiting POLB/POLA, as well as all regional approaches, does not exceed the design capacity of the Federal channel limits. Mariners are required to report their position prior to transiting through the Port to the COTP and the VTS, which monitors the positions of all inbound and outbound vessels within the precautionary area (i.e., the area designated near harbor entrances to set speed limits or to establish other safety precautions) and the approach corridor traffic lanes offshore Southern California.

Several measures are in place to ensure the safety of vessel navigation. Restricted navigation areas and routes, which are described in the following sections, have been designated to ensure safe vessel navigation.

Marine Exchange of Southern California

The Marine Exchange is a non-profit organization affiliated with the Los Angeles Chamber of Commerce. It was established to enhance navigation safety in the precautionary and harbor areas of the San Pedro Bay ports, as well as in Santa Monica Bay. The organization is supported by subscriptions from Port-related organizations that recognize the need for such an organization and use its services. The Marine Exchange monitors vessel traffic within the precautionary area. The service consists of a coordinating office, specific reporting points, and very high frequency-frequency modulation (VHF-FM) radio communications used with participating vessels. Vessel traffic channels and numerous aids to navigation (i.e., operating rules and regulations) have been established in the Ports and surrounding areas. The Marine Exchange also operates a Physical Oceanographic Real Time System (PORTS) (described below) as a service to those making operational decisions based on oceanographic and meteorological conditions in the vicinity of the Ports. The PORTS collects and disseminates accurate “real-time” information on tides, visibility, winds, currents, and sea swell to maritime users to assist in the safe and efficient transit of vessels in the Port area.

Vessel Transportation Service

The VTS is a service owned by the Marine Exchange and operated jointly by the Marine Exchange and the USCG under the oversight of the State Office of Spill Prevention and Response (OSPR) and the POLB/POLA Harbor Safety Committee. The VTS monitors traffic in the approach and departure lanes and inside the harbors. It uses radar, radio, and visual inputs to gather real-time vessel traffic information and broadcast traffic advisories and summaries to assist mariners. The VTS that services POLB/POLA is located at the entrance of the ports.

The system provides information on vessel traffic and ship locations so that vessels can avoid collisions, allisions, and groundings in the approaches to the POLB/POLA, including the borrow sites and sand transportation routes. The VTS assists in the safe navigation of vessels approaching POLB/POLA in the precautionary area.

Traffic Separation Scheme

Traffic Separation Schemes (TSSs) are internationally recognized vessel routing designations that separate opposing flows of vessel traffic into lanes, including a zone between lanes where traffic is to be avoided. TSSs have been designated to help direct offshore vessel traffic along portions of the California coastline such as the Santa Barbara Channel. Vessels are not required to use any designated TSS, but failure to use one, if available, would be a major factor in determining liability in the event of a collision. TSS designations are proposed by the USCG, but must be approved by the International Maritime Organization (IMO), which is part of the United Nations. The TSS offshore of the borrow sites in the Santa Barbara Channel and Santa Monica basin is depicted on Figure 3.14-1.

Safety Fairways

Offshore waters in high traffic areas are designated as safety fairways, in which the placement of surface structures, such as oil platforms, is prohibited to ensure safe navigation. The U.S. Army Corps of Engineers (USACE) is prohibited from issuing permits for surface structures within safety fairways, which are frequently located between a port and the entry into a TSS. No Project activities would occur within an established safety fairway.

Precautionary and Regulated Navigation Areas

A precautionary area is designated in congested areas near the POLB/POLA harbor entrances to set speed limits or to establish other safety precautions for ships entering or departing the harbor. A regulated navigation area (RNA) is defined as a water area within a defined boundary for which Federal regulations for vessels navigating within this area have been established under Code of Federal Regulations (CFR) 33 Part 165, subsection 165.1109. In the case of the POLB/POLA, RNA boundaries match the designated precautionary area. CFR 33, Part 165, subsection 165.1152, identifies portions of the precautionary area as RNA.

The precautionary area for POLB/POLA is defined by a line that extends south from Point Fermin for approximately 7 nautical miles (nm), continues due east approximately 7 nm, continues northeast for approximately 3 nm, and then heads back northwest. Ships are required to cruise at speeds of 12 knots (nm/hour) or less upon entering the precautionary area. A minimum vessel separation of 0.25 nm is also required in the precautionary area. The Marine Exchange monitors vessel traffic within the

precautionary area. With the exception of occasional visits to POLB/POLA for potential refueling and/or repairs, Project-related vessel traffic will avoid the POLB/POLA precautionary area.

Vessel Accidents

Marine vessel accidents include vessel collisions (between two moving vessels), "allisions" (between a moving vessel and a stationary object, including another vessel), and vessel groundings, referred to collectively as Accidents, Collisions, Groundings (ACG). Ships are typically involved in about 11 percent of all marine accidents, or only 7.7 percent of ACG incidents (U.S. Naval Academy 1999). The largest number of accidents involved tug boats and barges. Table 3.14-1 lists accident rates reported by different studies. There are no reliable, comparable data available on the number of recreational boating incidents.

Table 3.14-1. Vessel Accident Rates

Study/Source	Years, Range	Ships/Conditions Involved	Type of Accident	Probability per transit (%)
MIT	1981-1995	All ships	All accidents	0.065–0.11
USCG	1992-1998	All US ports, deep draft only	ACGs	0.20
USCG	1992-1998	Ships only	At sea collisions	0.013
USCG	1992-1998	Ships only	At sea groundings	0.010
USCG	1992-1998	Ships only	At sea allisions	0.0082
USCG	1992-1998	Ships only	Total All ACGs	0.031
FEMA	1980-1988	In harbors/bays	Collisions and groundings	0.10
FEMA	1980-1988	In harbors/bays	Collisions while moored	0.02
POLB/POLA	1997-2010	In POLB/POLA	Total All ACGs	0.046

Sources: Massachusetts Institute of Technology (MIT), 1998, U.S. Naval Academy 1999, Federal Emergency Management Agency (FEMA) 1989, Harbor Safety Committee 2011

Note: These commercial vessel accidents meet a reportable level defined in 46 CFR 4.05, but do not include commercial fishing vessel or recreational boating casualties.

Navigational Hazards

The Off-site Project areas are widely utilized and detailed navigational charts are available. All navigational hazards are well documented and charted.

Factors Affecting Vessel Traffic Safety

This section summarizes environmental conditions that could impact vessel navigation and safety in the vicinity of the Project area as well as in the vicinity of the Off-site Project areas.

Fog

Fog is a well-known weather condition in Southern California. Fog occurs most frequently in April and from September through January, when visibility over the southern end of the Santa Barbara Channel and Santa Monica Bay is below 0.5 mile for 7 to 10 days per month. This fog is mostly a land (radiation) type fog that drifts offshore and worsens in the late night and early morning. Smoke from regional industrial areas often adds to its thickness and persistence. Along the shore, fog drops visibility to less than 0.5 mile on 3 to 8 days per month from August through April, and is generally at its worst in December.

Winds

Wind conditions vary, particularly in fall and winter, when they are strongest and may include regionally unique Santa Ana winds. This offshore desert wind, though infrequent, may be violent. It occurs when a strong high-pressure system sits over the plateau region and generates a Northeasterly to Easterly flow over Southern California. Aside from weather forecasts, there is little warning of an onset of Santa Ana wind conditions: however, good visibility and unusually low humidity often prevail for some hours before these conditions materialize. Shortly before arriving on the coast, the Santa Ana wind event may appear as an approaching dark-brown dust cloud. This positive indication often gives a 10- to 30-minute warning prior to its arrival. The Santa Ana may come at any time of day and can be reinforced by an early morning land breeze or weakened by an afternoon sea breeze.

Winter storms produce strong winds over the southern end of the Santa Barbara Channel and Santa Monica Bay. Winds of 17 knots or greater occur about one to two percent of the time from November through May. Southwesterly through westerly winds begin to prevail in the spring and last into early fall.

Tides

The tides at Broad Beach are classified as mixed semidiurnal (two unequal highs and lows per day). Tide characteristics from the Los Angeles tide gage located nearest Dockweiler State Beach are shown in Table 3.14-2. The mean range of tide is 3.8 feet for the Broad Beach Restoration Area. The diurnal range is about 5.4 feet and a range of 8 to 9 feet may occur at maximum tide.

Table 3.14-2. Range of Water Levels near Dockweiler State Beach

Water Level	Elevation to MLLW Vertical Datum
Extreme High (observed January 27, 1983)	+7.8 feet
Mean Higher High Water (MHHW)	+5.5 feet
Mean High Water (MHW)	+4.7 feet
Mean Sea Level (MSL), 1983-2001 Epoch	+2.8 feet
National Geodetic Vertical Datum -1929 (NGVD29)	+2.6 feet
Mean Low Water (MLW)	+0.9 feet
North American Vertical Datum – 1988 (NAVD88)	+0.2 feet
Mean Lower Low Water (MLLW)	0.0 feet
Extreme Low (observed December 17, 1933)	-2.7 feet

Source: NOAA 2012

Oceanic Flow

The large-scale oceanic flow field within the Southern California Bight (SCB) is dominated by the California Current System, including the southward-flowing California Current and the northward-flowing Southern California Countercurrent (Hickey 1979, 1992, 1998). The diffuse southward-flowing current represents the eastern limb of the clockwise-rotating gyre that covers much of the North Pacific Basin. Subarctic water, before turning south to form the California Current, is carried along at high latitudes, where it is exposed to precipitation, atmospheric cooling, and nutrient regeneration. As a result, waters of the California Current are characterized by a seasonably stable low salinity, low temperatures, and high nutrient concentrations.

The California Current transports cool subarctic water southward along the California coast past Point Conception, where it separates from the coast and continues southward beyond the offshore reaches of the SCB. Within the southern SCB, portions of the California Current turn inward toward the coast, where they combine with the northward-flowing Southern California Countercurrent, and form a large, counterclockwise-rotating eddy. In contrast to the seawater properties of the California Current, the Southern California Countercurrent brings warmer, saltier, subtropical water northward along the coast.

Waves

The southern exposure of Malibu and the proximity of the Channel Islands offshore limit the direction from which potentially destructive storm waves can reach the area. The islands block, dissipate, refract, and reflect wave energy—thereby modifying the wave conditions along the mainland shoreline. Upcoast shoreline features also serve to create wave exposure windows and refract waves before they reach the Malibu area. The Southern California coast and Broad Beach are affected by three main types of

waves, including North Pacific and southern swells and locally generated seas; North Pacific swells are the most significant source of extreme waves in the region. Southern swells can also generate high waves, including from tropical storms that develop off the coast of Mexico. Locally generated seas in this area are usually less than 6 feet in height. The effect of these waves on the borrow sites is discussed more fully in Section 3.1, *Coastal Processes*.

Vessel Traffic

Vessel traffic in the transportation routes between Ventura Harbor and Dockweiler State Beach is dominated by commercial fishing and recreational vessels. While commercial shipping traffic is well regulated and monitored, similar information is not available for local commercial fishing and recreational vessel traffic in this area. Relatively heavy local traffic occurs in the immediate vicinity of local ports and harbors, including Ventura Harbor, Channel Islands Harbor, Port Hueneme, Marina Del Rey, King Harbor (Redondo Beach), and the POLB/POLA.

Broad Beach is fairly remote from local harbors, which results in relatively low recreational vessel activity. Using recreational fishing as an indicator of recreational vessel traffic in the area, Figure 3.14-2 shows that most recreational activity is located near Marina Del Rey/King Harbor, the Palos Verdes Peninsula just north of the POLB/POLA, and to a lesser extent, waters further offshore from Marina Del Rey.

Commercial fishing vessels have a longer range than recreational fishing vessels, and tend to be more active in areas further removed from the local harbors. As shown in Figure 3.14-3, commercial fishing vessel activity is heaviest in the areas between Port Hueneme and the Broad Beach.

3.14.2 Regulations Pertaining to the Public Trust

Many laws and regulations are in place to regulate marine vessel transportation, vessels calling at marine terminals, and emergency response/contingency planning. Responsibilities for enforcing or executing these laws and regulations fall to various Federal, State, and local agencies, as summarized below. Federal and local agencies and regulations play a key role in marine vessel traffic regulation and related protection of public trust resources and values.

Federal

Code of Federal Regulations

A number of Federal laws regulate marine vessel transportation. These laws address, among other matters, design and construction standards, operational standards, and spill prevention and cleanup. Regulations to implement these laws are contained

Figure 3.14-2. Recreational Fishing Vessel Activity

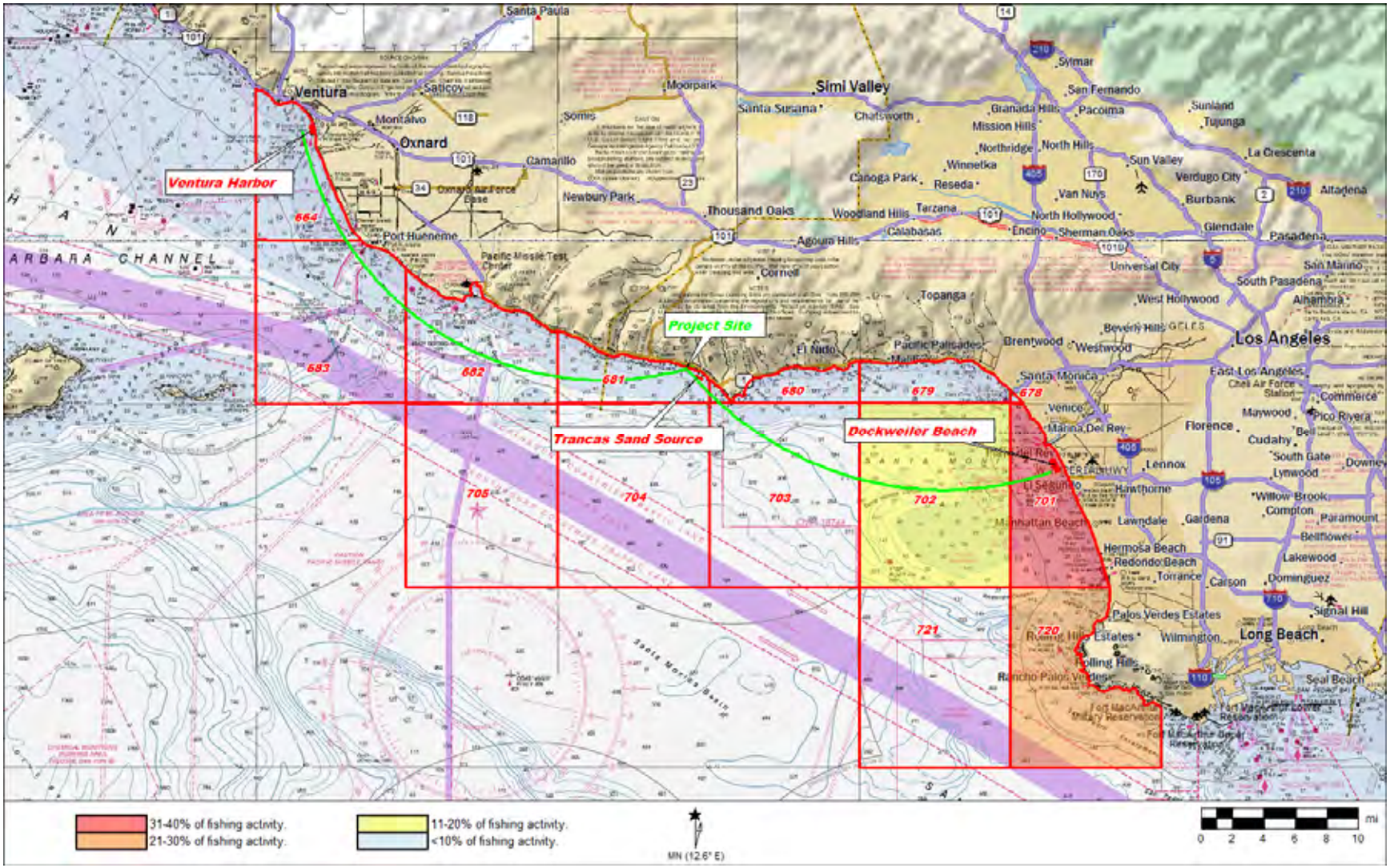
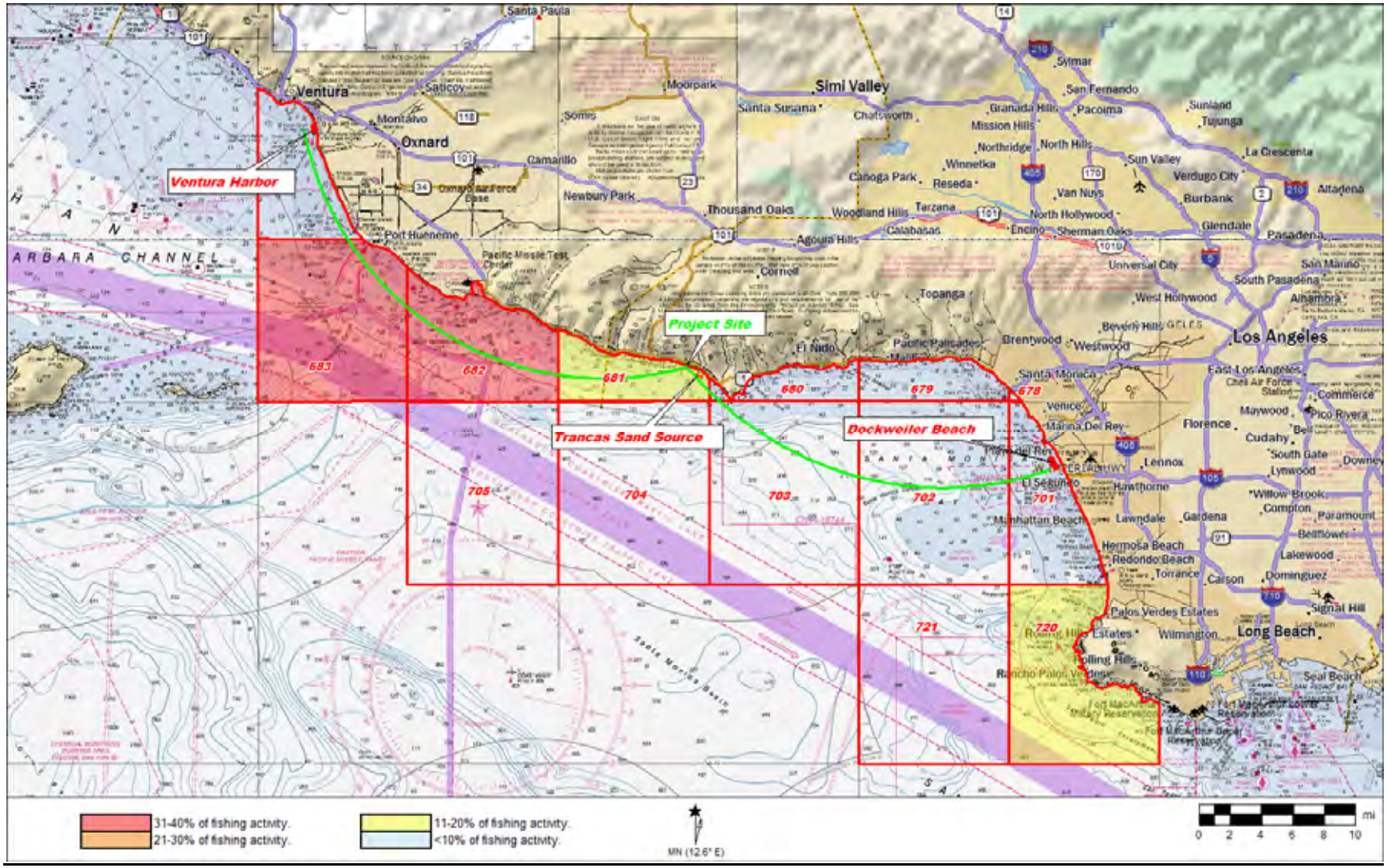


Figure 3.14-3. Commercial Fishing Vessel Activity



primarily in Titles 33 (Navigation and Navigable Waters), 40 (Protection of Environment), and 46 (Shipping) of the CFR.

United States Coast Guard

The USCG, through Title 33 (Navigation and Navigable Waters) and Title 46 (Shipping) of the CFR, is the Federal agency responsible for vessel inspection, marine terminal operations safety, coordination of Federal responses to marine emergencies, enforcement of marine pollution statutes, marine safety (navigation aids, etc.), and operation of the National Response Corporation (NRC) for spill response. They are also the lead agency for offshore spill response.

The Department of Defense

The Department of Defense (DoD), through the USACE, is responsible for reviewing all aspects of a project and/or spill response activities that could affect navigation. The USACE has specialized equipment and personnel for maintaining navigation channels, removing navigation obstructions, and accomplishing structural repairs.

Since 1789, the Federal government has authorized navigation channel improvement projects; the General Survey Act of 1824 established the USACE's role as the agency responsible for the navigation system. Since then, ports have worked in partnership with the USACE to maintain waterside access to port and harbor facilities.

Local

Harbor Safety Plan

The POLB/POLA Harbor Safety Plan (HSP) contains operating procedures for vessels operating in the port vicinity, including vessel operations offshore of Dockweiler State Beach. The vessel operating procedures stipulated in the HSP are considered Good Marine Practice; some procedures are Federal, State, or local regulations, while other guidelines are non-regulatory “Standards of Care.” The HSP provides specific rules for navigation of vessels in reduced visibility conditions, and establishes vessel speed limits (12 knots within the precautionary area or six knots within the harbor). These speed restrictions do not preclude the master or pilot from adjusting speeds to avoid or mitigate unsafe conditions.

City of Malibu Motorized Watercraft Ordinance

Under Chapter 12.08, Parks, Beaches, and other Recreation Areas, in the Malibu Code of Ordinances, boating is prohibited within 300 yards of the shoreline. Section 17.12.470 states that *a person shall not operate any vessel within 300 yards of the shoreline of any regulated beach except:*

- *When necessary to sail the vessel from or to a place of lawful mooring;*
- *When necessary due to an emergency aboard the vessel;*
- *When engaged in the use of a non-motorized vessel not exceeding 22 feet in length from or to any privately owned beach or from or to any public beach through a designated ocean access corridor that has been established by the Director for the launching of such vessels at such beach; or*
- *When engaged in the use of a motorized vessel the motor of which does not exceed 10 horsepower or an engine displacement of 225 cubic centimeters, whichever is less, from or to any privately owned beach, excluding, however, the beach located in the area between Point Dume and Paradise Cove.*

3.14.3 Public Trust Impact Criteria

To evaluate project impacts related to vessel traffic, many agencies have adapted the aircraft safety threshold outlined in Appendix G of the California Environmental Quality Act Guidelines to apply to vessel transportation. Appendix G is a guideline, which lists a number of environmental impact types to consider in the assessment of a project. Accordingly, a substantial impact on marine vessel transportation would occur if the Project would:

- Result in a change in vessel traffic patterns, including an increase in traffic volumes or a change in location that results in substantial incremental change in risks to vessel safety.

3.14.4 Public Trust Impact Analysis

Construction activities for both the initial beach and dune construction and for the one additional proposed renourishment effort would result in an increase in marine vessel traffic. This increase in marine vessel traffic would be primarily associated with sand transport between the two potential sand sources at Ventura Harbor and Dockweiler Beach, as well as the Trancas Sediment Deposit. Increased vessel traffic, especially in cases of barges being towed by tugboats, would increase the probability of an ACG incident. The duration of the sand transport activity for both the initial and follow on nourishment events would occur over a 5- to 6-month period, with lower intensity vessel traffic associated with sand placement along the shoreline.

The Project includes the potential for use of different types of dredges with associated effects on marine vessel traffic. At Dockweiler State Beach, one or two self-propelled hopper dredges would mine sand from offshore deposits and then perform the round trip to Broad Beach under its own power. These hopper dredges would have to travel south around the Palos Verdes Peninsula periodically to POLB/POLA to refuel.

At the Ventura Harbor sand source, a cutterhead suction or clam shell dredge would mine sand from the sand trap for loading onto either a scow or barge, which would then be towed by a tug to the Broad Beach. Under this option, tugs would refuel at Ventura Harbor, avoiding the need for transit south the POLB/POLA.

Crew boats would serve both of these options as well as the cutterhead suction dredge operating off of Broad Beach, bringing supplies and replacement crews a total of three times per day. Although no locations have been specified, crew boats would operate from nearby harbors.

Impact VS-1: Construction Impact to Marine Vessel Safety in the Broad Beach Restoration Area

Project construction would result in an increase in vessel traffic or a change in patterns of vessel movements that could impair the level of safety for vessels navigating in the Broad Beach Restoration Area (Unsubstantial with Implementation of Avoidance and Minimization Measures, Class UI).

Impact Discussion

Marine vessel traffic in the immediate vicinity of Broad Beach is relatively low due to the large distance to regional ports and harbors, and the relatively limited range of most recreational vessels. However, recreational activity in the area is relatively intensive, with many small beach-launched sailboats, windsurfers, paddleboards, kayaks, and other assorted “watercraft” in the water on a typical day. The Project represents a temporary but substantial increase in local vessel traffic, and would introduce a type of vessel traffic that is not presently characteristic of the area.

During the 5- to 6-month period required to deliver the sand for the Project, vessels related to the renourishment effort will frequently be transiting the Broad Beach Restoration Area. Depending on the type of barge used to transport sand, up to 250 barge deliveries could be required, resulting in 500 barge transits. In addition, there will also be frequent crew boat trips, resulting in up to 270 small-vessel trips.

The probability of a vessel ACG incident can be calculated based on the number of transits and an open ocean ACG probability of 0.00031 per transit. For the Project, using an overly conservative estimate of 600 barge transits, the probability of an ACG would be 0.155, or approximately a 16 percent chance that there will be an ACG incident during the initial construction period and any subsequent beach nourishment cycle.

However, although there is a relatively high statistical probability of an ACG, the vast majority of such accidents do not result in impacts to public health and safety. While the Project would result in a 16 percent chance of an ACG involving the dredge or barge, this occurrence could be as simple as a barge bumping against one of the other Project-

related vessels, the dredge, or a breakwater. Such accidents may result in no measurable impact or minor damage to the vessels, but do not necessarily create a public safety impact. General estimates of a conditional probability for more substantial accidents would be in the range of 10 percent or less, which would represent about a two-percent chance of a significant accident during the 6-month nourishment process. For example, there is an average of 6.6 ACGs each day in the POLB/POLA, but these seldom result in major damage or public safety issues. It is fairly rare that ACGs in the Ports result in what would be considered a significant incident. Therefore, this would be considered a less than substantial effect with avoidance and minimization measures (AMMs).

In addition to typical ACG hazards, towed barges pose a unique hazard to local mariners. In 2008, a collision between a recreational boat on a midnight cruise to Santa Catalina Island and a supply barge being towed back to the mainland resulted in the deaths of two boaters off the coast of Southern California. Investigators reported that the accident occurred at about 12:20 AM on October 2, 2008, shortly after a 26-foot Bayliner recreational vessel left the POLA for the 22-mile trip to Santa Catalina. The barge, the 128-foot Islander, was on the return leg of its run behind Rebel II, a 69-foot tugboat owned by Catalina Freight Line. The sky was clear and moonless, winds were light, and seas were less than three feet.

The accident was not reported until 7:30 AM, when a passing boater notified the USCG of a debris field containing life vests, a cooler and a tackle box five miles south of the entrance to POLA. Four days later, dive teams using sonar equipment and remotely operated cameras found the Bayliner on the ocean floor in about 150 feet of water.

Video evidence from a camera located in the Port indicated that the pleasure craft had its navigation lights energized prior to the collision and the barge had its navigation lights energized after the collision.

The captain of Rebel II was unaware of the collision until the USCG notified the company about the debris field. The captain had 37 years of maritime experience. A deck hand with 10 years of experience assisted him on the tug. The USCG determined that it was unlikely the tug captain would have felt the collision because the barge was on a towline more than 1,000 feet long.

Results of the accident investigation determined that the recreational vessel passed behind the tugboat, unaware that there was a barge 1,000 feet behind, and was subsequently struck by the barge.

Avoidance and Minimization Measures

AMM VS-1a: Marine Vessel Safety Plan. At least two weeks prior to the initiation of dredging, the Applicant shall file a marine vessel operation and safety plan with the U.S. Coast Guard that details Project operations and proposed safety management techniques. This shall also include a Notice to Mariners, which provides:

- The location and duration of operations;
- The number and type of vessels involved in the operation;
- The VHF-FM radio frequencies that will be monitored during the operation; and
- At least one Point of Contact and a 24 hour phone number

AMM VS-1b: Restrict barge transport during periods of low visibility. Barge transits during periods of poor visibility, defined as periods when the visibility is less than the distance between the tugboat and barge, shall be avoided to the maximum extent feasible. At no time shall a transit be initiated when the visibility is less than the distance between the barge and tugboat. Should the visibility degrade during a transit, vessel speed shall be reduced to five knots or less.

AMM VS-1c: Provide escort boat for all nighttime barge trips. All night time barge trips shall be accompanied by an escort boat crewed by a captain and one trained observer. The escort boat will accompany the barge on all trips that occur between sunset and sunrise.

AMM VS-1d: Provide lighting on the barge. Bow and stern lights shall be installed and energized during all nighttime barge transits and during periods of low visibility, defined as 0.25 nm or less.

AMM VS-1e: Provide lighting for all floating discharge lines and towlines. All discharge lines and/or towlines shall be equipped with energized lights during nighttime operations or periods of low visibility, defined as 0.25 nm or less.

AMM VS-1f: Utilize an observer on the tugboats. A deck hand shall be present on all barge transits and serve as a lookout for potential interactions with other vessels.

Rationale for Avoidance and Minimization Measures

Proposed increases in marine vessel traffic have a moderate potential to result in accidents, with the potential use of barges having unique concerns described above. Avoidance and minimization measures AMM VS-1a through VS-1e would put in place programs to reduce this potential risk to acceptable levels.

Impact VS-2: Construction Impact to Marine Vessel Safety in Borrow Sites and Sand Transportation Routes

Project construction would result in an increase in vessel traffic or a change in patterns of vessel movements that could impair the level of safety for vessels navigating in the area around the dredges or Project-related vessel routes (Unsubstantial with Implementation of Avoidance and Minimization Measures, Class UI).

Impact Discussion

Impacts in the Off-site Project areas would be similar to those described for the Project area; however, these potential impacts would occur in areas further offshore.

Avoidance and Minimization Measures

Avoidance and minimization measures identified to offset Impact VS-1 would also apply to Impact VS-2.

Rationale for Avoidance and Minimization Measures

Rationale for proposed avoidance and minimization measures would be similar to those for AMM VS-1a through VS-1f above.

Table 3.14-3. Summary of Marine Vessel Safety Impacts and Avoidance and Minimization Measures

Impact	Avoidance and Minimization Measures
VS-1: Construction Impact to Marine Vessel Safety in the Broad Beach Restoration Area and **VS-2:** Construction Impact to Marine Vessel Safety in Borrow Sites and Sand Transportation Routes	**AMM VS-1a.** Requires preparation and review of vessel operation and safety plan **AMM VS-1b.** Restrict barge transport during periods of low visibility **AMM VS-1c.** Requires use of an escort boat for night time barging operations **AMM VS-1d.** Provide lighting on the barge **AMM VS-1e.** Provide lighting for all floating discharge lines and towlines **AMM VS-1f.** Utilize an observer on the tugboats